

## CLAIMS:

1. A method of two-dimensional optical storage of user data on an optical storage media, the method comprising writing user data to said media and providing one or more calibration bits, in addition to said user data, at one or more known locations on said media.
- 5 2. A method of reading out user data stored on an optical storage media on which user data is stored in a two-dimensional format and on which one or more calibration bits, in addition to said user data, are provided at known locations, the method comprising successively illuminating portions of said optical storage media with incident electromagnetic radiation, reconstructing said user data from electromagnetic radiation reflected therefrom,  
10 determining a signal waveform in respect of electromagnetic radiation reflected from said one or more calibration bits, and reconstructing therefrom the electric field distribution of said radiation reflected from said one or more calibration bits.
3. A method according to claim 2, wherein a matrix multiplication is performed  
15 on said signal waveform to obtain linear interference coefficients, from which the electric field distribution of said radiation reflected from said one or more calibration bits is reconstructed.
4. A method according to claim 3, further comprising retrieving from the electric  
20 field distribution aberrations in respect of the incident electromagnetic radiation.
5. A method according to any one of claims 2 to 4, comprising determining a centre of mass of the electric field distribution of electromagnetic radiation reflected from the one or more calibration bits and determining therefrom radial offset and/or tilt of the optical  
25 storage media and/or the incident electromagnetic radiation.
6. A method according to any one of claims 2 to 5, comprising determining an intensity of the electric field distribution of electromagnetic radiation reflected from the one

or more calibration bits, and determining therefrom a value for spherical aberration and/or defocus of the incident electromagnetic radiation.

7. A method according to claim 6, further including the step of determining the  
5 ellipticity of the intensity, and determining therefrom a level of astigmatism of the incident electromagnetic radiation.

8. Apparatus for reading out user data stored on an optical storage media on  
which user data is stored in a two-dimensional format and on which one or more calibration  
10 bits, in addition to said user data, are provided at known locations, the apparatus comprising  
means for successively illuminating portions of said optical storage media with incident  
electromagnetic radiation, means for reconstructing said user data from electromagnetic  
radiation reflected therefrom, means for determining a signal waveform in respect of  
electromagnetic radiation reflected from said one or more calibration bits, and means for  
15 reconstructing therefrom the electric field distribution of said radiation reflected from said  
one or more calibration bits.

9. Apparatus according to claim 8, further including means for identifying from  
the signal waveform aberrations in respect of the incident electromagnetic radiation.  
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10. Apparatus according to claim 9, comprising means for correcting for the  
identified aberrations.

11. A two-dimensional optical storage medium for receiving and storing user data  
25 in a two-dimensional format, on which is provided one or more calibration bits at known  
locations thereon.